CONCRETE RAILROAD GRADE CROSSING PANELS

Your Petitioner, THOMAS L. EGAN, JR., a citizen of the United States and a resident of the State of Nebraska, whose post office address is 9110 Davenport Street, Omaha, Nebraska 68114, prays that Letters Patent may be granted to him for the invention set forth in the following specification:

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to an improved concrete railroad grade crossing, and more particularly to an improved railroad grade crossing comprising concrete gauge panels which extend between the rails and further comprising concrete field panels which extend between each rail and the roadway. Even more particularly, the invention relates to improved elastomeric gauge seals which are attached to the sides of the gauge panels and relates to improved elastomeric field seals which are attached to the inner ends of the field panels. More particularly, the invention relates to the means for securing the seals to the panels through the use of bolts which extend through the metal edge protector of the panel and into the side of the seal for connection to an elongated member channel positioned in an elongated channel-shaped cavity in the seal.

2. DESCRIPTION OF THE PRIOR ART

Frequently, a railroad track crosses a roadway which necessitates that the space between the rails be filled with a material which brings that space up to grade. It is also necessary to bring the approaches on either side of the rails up to grade. In the past, precast concrete panels, or gauge panels, have been positioned between the rails and

precast concrete panels, or field panels, have been positioned on the approach sides of the track. The prior art railroad grade crossings have also used elastomeric seals on the sides of the concrete gauge panels to fill the space between the gauge panels and the rails to prevent foreign materials from entering and filling the space between the gauge panels and the rail. The prior art railroad grade crossings have also used elastomeric seals on the inner ends of the concrete field panels to prevent foreign materials from entering and filling the space between the field panel and the associated rail. In some cases, the upper inner ends of the field panels and the upper outer ends of the gauge panels were chamfered or beveled to prevent portions of the concrete field panels and gauge panels from chipping off and filling the spaces between the panels and the rails. In other cases, angle irons or edge protectors have been used as edge protectors to prevent the chipping problem.

In later years, the gauge seals and field seals have been partially embedded in the concrete panels to aid in attaching the seals to the panels. However, even where the seals are partially embedded in the prior art concrete panels, it is believed that the prior art devices experience some attachment problems of the seals. Assignee's co-pending application, Serial No. 10/268,398 filed October 10, 2002, is believed to solve at least some of the attachment problems. The instant invention is believed to represent a further advance in the art.

SUMMARY OF THE INVENTION

A railroad grade crossing for extending a roadway across a pair of parallel spaced-apart rails is disclosed. The railroad grade crossing includes one or more

concrete gauge panels which extend substantially between the rails. Each of the gauge panels has a top surface which is substantially coplanar with the roadway with the bottom surface of the gauge panel being supported upon the ties. Each of the gauge panels has an elongated elastomeric gauge seal on each side thereof which is positioned adjacent the rails. The upper ends of the gauge seals are positioned downwardly from the top surface of the gauge panel with the upper ends of the gauge seals having arcuate recessed portions formed therein adjacent the outer ends thereof. The inner ends of the gauge seals are attached to the gauge panels by a bolt and channel member assembly. Concrete field panels are positioned between each rail and the roadway associated therewith. Each of the concrete field panels has a top surface which is substantially coplanar with the roadway and a bottom surface which is supported upon the ties. The field panels have elastomeric field seals at their inner ends thereof with the upper ends of the field seals being preferably positioned downwardly from the top surface of the field panels. The inner ends of the field seals are attached to the inner ends of the field panels by a bolt and channel member assembly.

Elongated, metal angle members (edge protectors) are cast in the upper outer edges of the gauge panels and the upper inner edges of the field panels and are maintained therein by horizontally disposed DBAs (deformed bar anchors) and by vertically disposed headed studs. The bolt and channel member assembly which connects the seals to the panels comprises a plurality of horizontally spaced-apart bolts extending outwardly through slots formed in the vertical legs of the edge protectors with

the heads of the bolts being positioned at the inner surface of the vertical legs. The bolts extend through openings formed in the inner sides of the seals with the openings communicating with an elongated channel-shaped cavity formed in the seal. One or more channel members are positioned in the channel-shaped cavity and have nuts welded thereto which are positioned thereon in register with openings formed in the web of the channel member. The threaded inner ends of the bolts extend through the openings formed in the web of the channel member and are threadably attached to the nuts on the channel member to secure the seal to the panel.

It is therefore a principal object of the invention to provide an improved concrete railroad grade crossing.

A further object of the invention is to provide an improved concrete railroad grade crossing comprising concrete gauge panels and concrete field panels wherein elastomeric seals are bolted to the panels and extend therefrom so as to be positioned adjacent the rails.

Still another object of the invention is to provide an improved method of attaching elastomeric gauge and field seals to gauge panels and approach panels, respectively.

Still another object of the invention is to provide an improved railroad crossing which has greater durability than the railroad grade crossings of the prior art.

These and other objects will be apparent to those skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a partial top plan view of the concrete railroad grade crossing of this invention;

Figure 2 is a partial vertical sectional view of the concrete railroad grade crossing of this invention;

Figure 3 is a partial exploded perspective view of one of the field panel seals of this invention;

Figure 4 is a partial exploded perspective view of one of the gauge panel seals of this invention;

Figure 5 is a partial vertical sectional view of the concrete railroad grade crossing of this invention; and

Figure 6 is a partial exploded perspective view of one of the field seals of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, the numeral 10 refers to a railroad track including rails 12 and 14 which are supported upon a plurality of spaced-apart ties 16 by means of tie plates 18 which are secured to the ties 16 in conventional fashion such as by spikes, clips or bolts. In many cases, the railroad track 10 must cross a roadway which is generally referred to by the reference numeral 20.

Normally, a plurality of precast concrete approach or field panels 22 will be positioned between the roadway 20 and the rails 12 and 14 with the field panels 22 being supported upon the outer ends of the ties 16. Normally, the field panels 22 will be positioned between the roadway 20 and one of the rails in an end-to-end fashion, the number of which will depend upon the width of the roadway and the length of the field panels. The numeral 24 refers to precast concrete gauge panels which are positioned

between the rails 12 and 14 and which are supported upon the ties 16. The gauge panels 24 are supported upon the ties 16 in an end-to-end fashion, the number of which will depend upon the width of the roadway and the length of the gauge panels.

Each of the approach or field panels 22 is comprised of a precast concrete material and includes top surface 26, bottom surface 28, and opposite sides 30 and 32. Field panel 22 is provided with a recessed portion 34 formed therein at each of the opposite sides thereof to provide a clearance space for the spikes, bolts, clips, etc., which secure the tie plates 18 to the ties 16 and which secure the rail to the tie plate 18 in conventional fashion.

An elongated, metal angle member 38 (edge protector) is cast in the field panel 22 at the upper inner side thereof, as illustrated in the drawings, and which is held in place in the concrete by horizontally disposed and horizontally spaced retainers, rods or bars 40 secured thereto which are commonly referred to as DBAs (deformed bar anchors). The angle member 38 is also held in place by a plurality of vertically disposed and horizontally spaced retainers or studs 41 secured thereto having enlarged head portions at their lower ends. As will be explained in more detail hereinafter, a field seal 42 is secured to the inner end of each of the field panels 22.

Each of the gauge panels 24 is comprised of a precast concrete material and includes top surface 44, bottom surface 46, and opposite sides 48 and 50. Gauge panel 24 is provided with a recessed portion 52 at side 48 and is provided with a recessed portion 54 at its side 50, as seen in Figure 2, to provide a clearance space for

the spikes, bolts, clips, etc., which secure the tie plates 18 to the ties 16 and which secure the rails to the tie plates 18 in conventional fashion.

Elongated, metal angle members (edge protectors) 56 and 58 are cast in the gauge panel 24 at the upper outer sides thereof, as illustrated in the drawings, and which are held in place by horizontally disposed and horizontally spaced retainers, rods or bars 60 (DBAs) secured thereto. The angle members 56 and 58 are also held in place by a plurality of vertically disposed and horizontally spaced retainers or studs 61 secured thereto having enlarged head portions at their lower ends. As will be explained in more detail hereinafter, gauge seals 62 and 64 are secured to the outer sides of each of the gauge panels 24. Inasmuch as gauge seals 62 and 64 are identical, only gauge seal 62 will be described in detail.

As seen in Figures 3 and 6, field seal 42 is preferably comprised of an elastomeric material generally having an outer end 66 and an inner end 68. The upper end 70 of seal 42 is preferably ribbed, as illustrated in Figure 6, with upper end 70 being preferably positioned below the top surface of the panel 22 and below the upper end of the associated rail (Figure 2).

Elongated voids 72 and 74 are formed in the seal 42 to reduce the amount of material required to fabricate the seal. Additional voids may be utilized if so desired. Seal 42 is provided with an elongated channel-shaped cavity 76 formed therein which extends between the ends of the seal. Although other configurations of the cavity 76 may be used, it is preferred that the cavity 76 be channel-shaped in cross-section. For purposes of description, cavity 76 will be described as including an upper cavity portion

78, intermediate cavity portion 80, and lower cavity portion 81. A plurality of horizontally spaced-apart openings 82 extend inwardly from the inner end 68 of seal 42 into the cavity 76. One or more channel members 84 are positioned in cavity 76 as seen in the drawings. For purposes of description, each of the metal channel members 84 will be described as having an upper flange 86, web 88 and lower flange 90. The web 88 is provided with a plurality of horizontally spaced-apart openings 92 formed therein. Flange nuts 94 are welded to web 88 as seen in the drawings at each of the openings 92. Edge protector 38 has a plurality of horizontally spaced-apart slots 96 formed therein. Bolts 98 extend outwardly through slots 96 in edge protector 38, through openings 82, and through openings 92 in channel member 84 for threadable connection to the nuts 94 to secure the seal 42 to the panel 22.

The gauge seals 62 and 64 have elongated channel-shaped cavities 76' formed therein which are identical to the cavities 76 of seal 42 and which receive channel members identical to channel members 84. The edge protectors 56 and 58 have slotted openings 96' formed therein which are identical to slots 96.

The gauge seals 64 are secured to the opposite sides of the gauge panel 24 in a manner identical to that just described. Bolts 98' extend through slots 96' in the vertical leg portion of edge protectors 56 and 58 through openings 82' in seals 62 and 64, through openings 92' in channel members 84' for threadable connection to the nuts 94' which are welded to the channel members 84'.

The bolts 98 and 98' are positioned in the edge protectors during the assembly of the panels prior to concrete being placed into the form. The seals are also attached to

the bolts 98 and 98' before concrete is placed into the form. The slots 96 and 96' permit the bolts 98 and 98' to be brought into alignment with the openings 92 and 92'. The bolts are threadably received by the nuts 94 and 94' to securely fasten the seals to the panels. The channel-shaped cavities in the seals help to maintain the channel members 84 and 84' in the seals in the proper position while the seals are being attached to the panels so that the openings 92 will be in alignment with the openings 82.

The invention herein ensures that the seals will be securely attached to the panels and will not become detached therefrom during or after installation. The invention herein also provides a method of attaching the seals to the panels which facilitates rapid assembly of the structure.

Thus it can be seen that the invention accomplishes at least all of its stated objectives.